Under what circumstances will people seek scientific information? A structural equation model of communication factors, AI risk-benefit perception and information seeking in China.

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#ESR: Environment, Science and Risk Communication

ID number:

2424

Abstract

As a quickly growing technology in China, AI is taken in by the Chinese public's with mixed feelings. Information seeking can improve individuals' adoption of emerging technology. However, little is known about the circumstances under which people are prior to implementing information seeking behaviors. In this study, we designed a model combining communication factors and personal perceptions to predict information seeking behaviors. 746 participants were recruited from a national sampling pool. The results showed that traditional media use can lessen information seeking, while new media use and interpersonal discussion can improve information seeking. For personal perceptions, we found that benefit perceptions rather than risk perceptions of AI technology, can mediate the relationship between communication factors and information seeking, which showed that Chinese people cared more about benefits than risk perceptions of AI technology. The theoretical and practical implications are discussed.

Keywords: Artificial Intelligence, risk perception, benefit perception, media use, interpersonal discussion, online survey

Introduction

As an emerging technology, artificial intelligence (AI) is growing quickly in China. While the government and tech companies actively boost the AI industry, the Chinese public holds mixed feelings towards AI, while some passionately greet the coming of the AI era, fear also exists (China Institute for Science and Technology Policy, 2018). Chinese citizens' perception towards AI cannot come out of nowhere, as most people are cognitive misers (Fiske & Taylor, 1991), channels like mass media and interpersonal discussion can provide shortcuts for the public to better understand emerging technologies. In this study, we focus on the background of China and explore the influence of communication factors and interpersonal discussion on individuals' AI perception.

For emerging technologies, the public can perceive their risks and benefits simultaneously when they are communicating scientific issues. Further information seeking can help them better understand emerging technologies. The Risk Information Seeking and Processing (RISP) model (Griffin, Dunwoody, & Neuwirth, 1999) proposes that risk messages will lead to information seeking to cope with the unknown risk. However, little is known about the likelihood of information-seeking behavior when a person holds a positive attitude towards emerging technologies, as individuals rely more on communication shortcuts to form opinions. Overall, we will compare the extent to which the risk and benefit perception towards AI can respectively encourage individuals to seek further information about AI.

In sum, this study compares the communication antecedents and consequences of different AI perceptions in the Chinese context. Theoretically, we hope to further the understanding of information seeking of emerging technology by considering the effect of benefit perception. Practically, to see how different communication channels influence

individuals' perception towards AI, scientific communicators and policy makers can accordingly better design their communication strategies to help the public learn more about emerging technologies.

Predicting information seeking behaviors

Information seeking is a "taken-for-granted concept" (Case & Given, 2007, p. 81) when people find there is an interest or knowledge gap in one area and then to acquire new information (Zerbinos, 1990). As an act to fill the knowledge gap, information seeking can make a person a potential adopter of a new technology (Agarwal & Prasad, 1998), which is why we are focusing on information seeking under the topic of AI.

Based on the literature, this section will discuss the variables that can affect people's information seeking towards AI. Two groups of factors are included: communication factors and personal perceptions of AI. For communication factors, the study examines traditional media use (i.e., newspaper, television, movie), new media use (i.e., WeChat, Weibo, online platform, and the Internet), and interpersonal discussion. For personal perceptions, the study examines risk perceptions and benefit perceptions of AI.

Communication factors

At the early stage of information seeking studies, some models have begun to notice the importance of information carrier factors or communicators as information providers (e.g., Johnson & Meischke, 1993; Wilson, 1999), and believed the ease of use, credibility, and authoritativeness will influence the information seeking actions(Johnson & Meischke, 1993), involving choosing which source(s) to use and the depth of the search. Specifically,

communication factors like media and interpersonal discussion can work as information carriers to individuals.

Media is frequently believed to represent and frame new technology (Stuart, 2002). According to Wilson (1999), the link between information seeking and communicators should be a circulation. A person in a context can both be influenced by the channels of communication after processing and use, and seek information with channels of communication. The underlying assumption is that people will seek information with channels of communication and this assumption is not cloud-built. With this loop, we can ascertain that when a person pays attention to the information presented on a media channel on one topic, he or she will also pay attention to the information on the same topic from other channels. While professional journalism aims to communicate new technologies accurately and objectively (Dunwoody, 2014), other traditional media exaggerated the catastrophic consequences of emerging technologies (Stuart, 2002). However, on new media, especially social media, people employs a more positive angle to describe new technology and plays an important role in diffusion and social shaping of technology perspectives (Lievrouw, 2002). Based on the TPB theory (Ajzen, 1991), the image of new technologies, like AI, presented on media channels will influence people's attitudes towards new technologies and therefore influence their relevant behaviors. Therefore, we made the following hypotheses.

H1(a): Traditional media use will have a negative effect on information seeking behavior on AI topics.

H1(b): New media use will have a positive effect on information seeking behavior on AI topics.

Beyond new media and traditional channels of mass communication, some researches in the field of health communication studies often concerns the role of interpersonal discussion. Even interpersonal discussion is presumed to operate in tandem with information seeking to propagate relevant knowledge (e.g., Rimal & Real, 2005; Valente & Saba, 1998). We feel obliged to consider the relationship between information seeking and interpersonal discussion in the field of scientific communication. There follows our third hypothesis:

H1(c): Interpersonal discussion will have a positive effect on information seeking behaviors on AI topics.

Public perceptions: risk and benefit perceptions

Previous studies have ascertained that risk perception is by all means crucial in understanding information seeking behaviors. Risk perception refers to the judgements made by individuals to evaluate the potential risks (Slovic, 1987). According to Slovic (1987), uncertainty was hidden behind risk perception and it would further enhance individuals' risk perception. Individuals would be driven by the uncertainty brought by risk perception to conduct information seeking activities to reduce the uncertainty. Bradac (2001) went further on the relationship between uncertainty and risk perception, by which he believed that risk perception and uncertainty could intertwine each other in a risk experience and thus made information seeking behaviors happen. However, the lack of theorization about the relationships among risk perception, uncertainty and information seeking behaviors had always been the focus of scholarly criticism, until when Griffin et al. (1999) proposed the model of risk information seeking and processing (RISP model). Based on the heuristic-systematic model (HSM) (Chaiken, 1980) and the theory of planned behavior (TPB theory) (Ajzen, 1991), the RISP model identified an amount of variables (information insufficiencies, channel beliefs, subjective norms, perceived

risk characteristics, and demographics) to predict how the risk messages processing affected information seeking behavior (Griffin et al., 1999). The RISP model has been tested and applied in many contexts of scientific communication (e.g., Huang & Yang, 2020, etc.; Hwang & Jeong, 2020; Yang & Liu, 2021, etc.), and thus we have ample evidence to believe that risk perception will be positively associated with information seeking.

H2(a): Risk perception will have a positive effect on information seeking.

However, another public perception—benefit perception has always been overlooked when studying the predictors of information seeking. The concept of benefit perception is always intertwined with perceived benefits in science communication and their work functionally related to each other (e.g., Besley, Lee, & Pressgrove, 2021; Siegrist, Cvetkovich, & Roth, 2000). Perceived benefits and perceived risks are a pair of concepts which are offset from each other when people are exposed to new information and technology. For example, scholars in gene technology (Siegrist, 2000) and nanotechnology (Siegrist, Cousin, Kastenholz, & Wiek, 2007; Siegrist, Stampfli, Kastenholz, & Keller, 2008) have studied that the first users and believers attributed more benefits and fewer risks in their perception of these technologies. When exposed to AI-related technology, as a new technology in our research context, people's perceived benefits and risks should be considered to the same degree of importance.

As for the relationship between benefit perception and information seeking behaviors, some scholars applied benefit perception as a balancing variable to reduce the bias brought by solely asking respondents about risk perceptions (e.g., Kahlor et al., 2020; Yang & Liu, 2020). Kahlor et al. (2020)'s model revealed that risk/benefit perceptions will have an effect on affective risk response (risk perceptions on worries, and benefit perceptions on hope), and therefore influence people's seeking intent. Therefore, we made the following hypothesis:

H2(b): Benefit perception will have a positive effect on information seeking.

Communication factors to predict public perceptions

Additionally, this study examines the relationship between communication factors and public perceptions, to predict the effect of the association between these two kinds of dependent variables on information seeking.

As representation and frame of new technologies (Stuart, 2002), the media can picture images of new technologies and impact how people perceive them and relevant scientific issues. For instance, Gamson and Modigliani (1989)'s study on people's opinion about nuclear weapons showed that public support for nuclear power could be linked to the changing media discourse in the U.S. Other studies have shown that exposure to media discourse about scientific technologies (e.g., nanotechnologies) can influence people's attitudes towards these technologies directly and indirectly (Ho, Scheufele, & Corley, 2013). The reason behind this is that the media can influence people's personal perceptions about one object and then influence their attitude and adoption of one technology (Silva, 2015).

Since both traditional media and new media can influence individuals' perceptions and attitudes about emerging technologies, we explored the possible relationships between media use (both traditional and new) and personal perceptions. We discussed earlier that traditional media, especially television and cinema, is prior to communicating new technologies with exaggerated risks and catastrophic effects on human society. Therefore, we made the hypotheses between different media use and different personal perceptions:

H3(a): Traditional media use will have a negative effect on benefit perceptions about AI technologies.

H3(b): Traditional media use will have a positive effect on risk perceptions about AI technologies.

For new media, the Chinese government is passionately sponsoring AI development, with the technological capital, including top Internet companies like Tencent and Alibaba, investing heavily in AI research. Nevertheless, the new media held by these tech giants will also support China's main policies. For example, AlphaGo's overwhelming victories over several Go grandmasters triggered media coverage and online discussion on how AI will influence human society in the future. Therefore, we made the possible hypotheses between new media use and individuals' personal perceptions:

H3(c): New media use will have a positive impact on individuals' benefit perceptions on AI technologies.

H3(d): New media use will have a negative impact on individuals' risk perceptions on AI technologies.

Previous studies (Lin & Lagoe, 2013; Morton & Duck, 2001) have ascertained that interpersonal discussion can play a role in the amplification of media effects on personal risk perceptions. The authors also found the correlation between interpersonal discussion and personal risk perceptions was larger than any other effects generated by media exposure (Morton & Duck, 2001), which showed that we can consider interpersonal discussion as a single factor to evaluate its influence on personal risk perceptions. This phenomenon not only occurs in evaluating risk perceptions, also in evaluating benefit perceptions. (Binder, Scheufele, Brossard, & Gunther, 2011) explained that interpersonal discussion had the potential to operate as amplifiers of perceptions of both risks and benefits, as individuals always confirmed themselves to like-minded environments. Based on the studies above, we made the following hypotheses:

H4(a): Interpersonal discussion will have a positive impact on individuals' benefit perceptions on AI technology.

H4(b): Interpersonal discussion will have a positive impact on individuals' risk perceptions on AI technology.

The hypotheses proposed above suggested a hypothetical model (see Figure 1.), indicating that communication factors directly and indirectly (through risk and benefit perceptions) influenced the information seeking on AI-related topics.

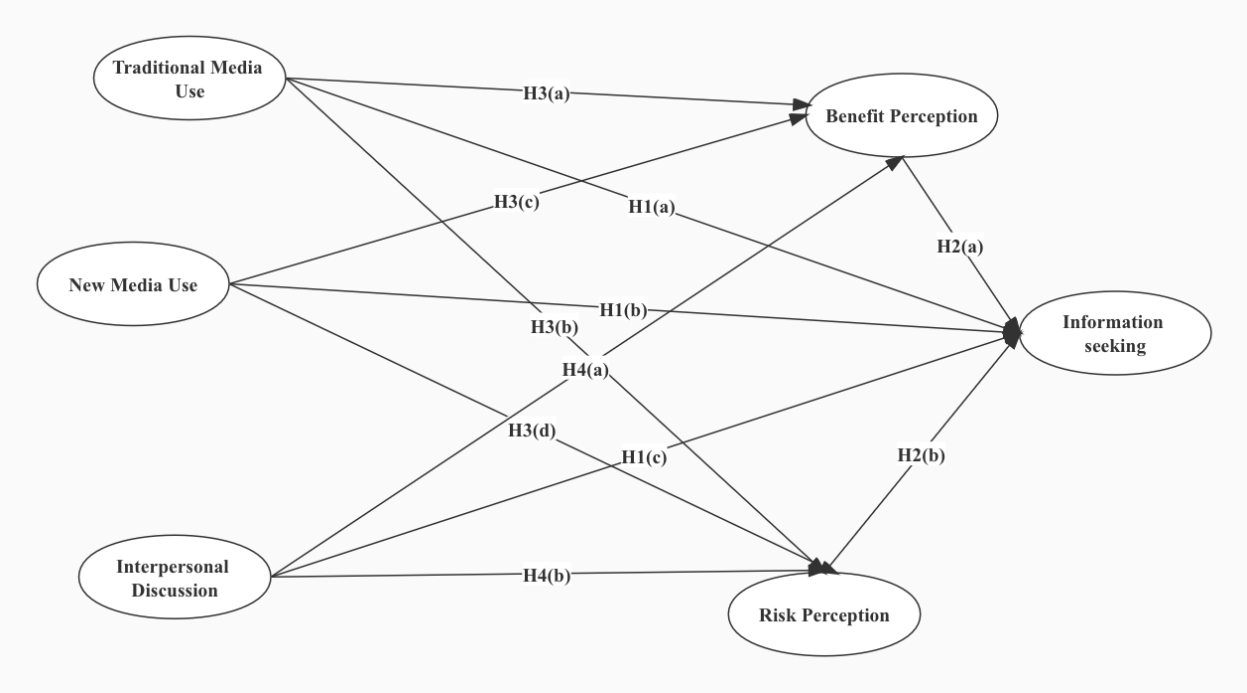

Figure 1. Proposed theoretical model of the effects of communication factors on public perceptions and information seeking.

Method

An online survey was conducted through a China online research platform Sojump (www.sojump.com) that offers industries and academic professional sampling and data collection using a national sample pool of 2.6 million panel members from a wide range of

geographic and occupational backgrounds. To ascertain the authenticity of personal information, Sojump vets all potential respondents by verifying their email addresses and mobile numbers. The application of Sojump in communication studies, especially in the context of the Chinese communication environment has become commonplace (e.g., Gan et al., 2021; Jia, Liu, & Shao, 2019). We randomly recruited participants from the sampling pool and 752 questionnaires were collected, among which we dropped invalid cases and had a sample size of 746. Respondents were all Mainland Chinese, from 28 provinces or regions.

Demographics

The demographic information collected include gender (male = 44.2%), age (M = 32.87, SD =8.33, ranging from 17 to 69 years old), education (M = 3.85, SD = .64, 3 = senior high school or equivalent), and income per month (M = 4.67, SD = 1.85, 4 = RMB ¥4001-¥6000, equivalent to US $640-$950). All these demographics were treated as controlled variables in the data analysis.

Measure

Media use. We used a five-point scale (1 = never; 5 = very often) to measure media use. For traditional media use, respondents were asked to rate their frequency with which they use TV (M = 3.21, SD = .90, α = .66), newspaper (M = 2.74, SD = 1.04, α = .80), movies (M = 3.07, SD = .96, α = .88) to follow AI-related a) information and b) discussion. For new media, respondents rated their frequency with which they use Weibo (M = 3.06, SD = 1.00, α = .93), WeChat (M = 3.25, SD = .85, α = .90), online platform (M = 3.21, SD = .86, α = .90) and the Internet as a whole (M = 3.30, SD = .84, α = .78) to follow AI-related a) information, b) news, c) articles, and d) discussions.

Interpersonal discussion. A five-point scale (1 = never; 5 = very often) was used to measure interpersonal discussion. Respondents stated their frequency with which they discussed AI-related topics with their a) friends (M = 3.11, SD = .96), b) colleagues (M = 3.18, SD = 1.05), and c) families (M = 2.87, SD = .95). And the interpersonal discussion, as a complex variable, presents the following: M = 3.05, SD = .84, α = .82.

Risk perception. Risk perception was measured with Wang (2017)'s adapted five-point Likert scale (1 = strongly disagree; 5 = strongly agree). Measurements included: a) AI will affect the future generation of mankind; b) AI will affect human's standards of living; c) AI will threaten human society; and d) AI will affect the continuity of human society (M = 3.22, SD = .68, α = .71). These measurements were divided into three segments: the respondents' risk perception on a) personal presence (M = 3.36, SD = .75), b) human's presence (M = 3.27, SD = .78), and c) human's future (M = 3.16, SD = .75).

Benefit perception. Benefit perception was measured with a five-point Likert scale (1 = strongly disagree; 5 = strongly agree) to measure the following four items: a) convenience: AI will make life more convenient; b) cost reduction: AI will lower the living cost; c) problem solving: AI will solve the problems that humans face; and d) benefit estimation: Even some problems may arise, AI's advantages should not be underestimated (M = 3.90, SD = .56, α = .70).

Information seeking. Information seeking was measured with a five-point Likert scale (1 = strongly disagree; 5 = strongly agree) with four items: a) seek trying: I will try to search for AI-related information recently; b) seek initiative: I will be actively searching for AI-related information recently; and c) time spent: I will be spending time seeking AI-related information recently (M = 3.43, SD = .74, α = .85).

Results

To explore the relationships among communication factors (media use and interpersonal discussion), risk-benefit perception and information seeking, we performed structural equation model analysis (N = 746) in AMOS 27.0, SPSS 26.0. We used the residualization procedure to achieve both model parsimony and control. We controlled age, gender, education, income per month, which involved regressing all the studied variables on the controlled variables and then using the residuals of the studied variables in the analysis. Figure 2 shows the significance of the coefficients.

H1(a) predicted that traditional media use will have a negative effect on information seeking behaviors on AI topics, while H1(b) predicted that new media use will have a positive effect on information seeking behaviors. The results showed that the path coefficients were both statistically significant (β = -.28, p < .05; β = .70, p < .05). H1(c) predicted that interpersonal discussion will have a positive effect on information seeking behaviors, which is also supported by the results (β = .22, p < .05). H2(a) and H2(b) predicted the effect of risk perceptions and benefit perceptions on information seeking. H2(a) was not significant (β = -.02, p >.05) but H2(b) was supported (β = .07, p <.05). H3(a), H3(b), H3(c) and H3(d) predicted the effect of media use (traditional media use and new media use) on personal perceptions of AI technologies. H3(a) was supported (β = -.45, p <.05); H3(b) was not supported (β = -.21, p <.05); H3(c) was supported (β = .68, p <.05); H3(d) was not significant (β = .25, p >.05). H4(a) and H4(b) predicted the impact of interpersonal discussion on personal perceptions of AI technology. H4(a) and H4(b) were neither supported by the results (β = -.02, p >.05; β = .04, p >.05).

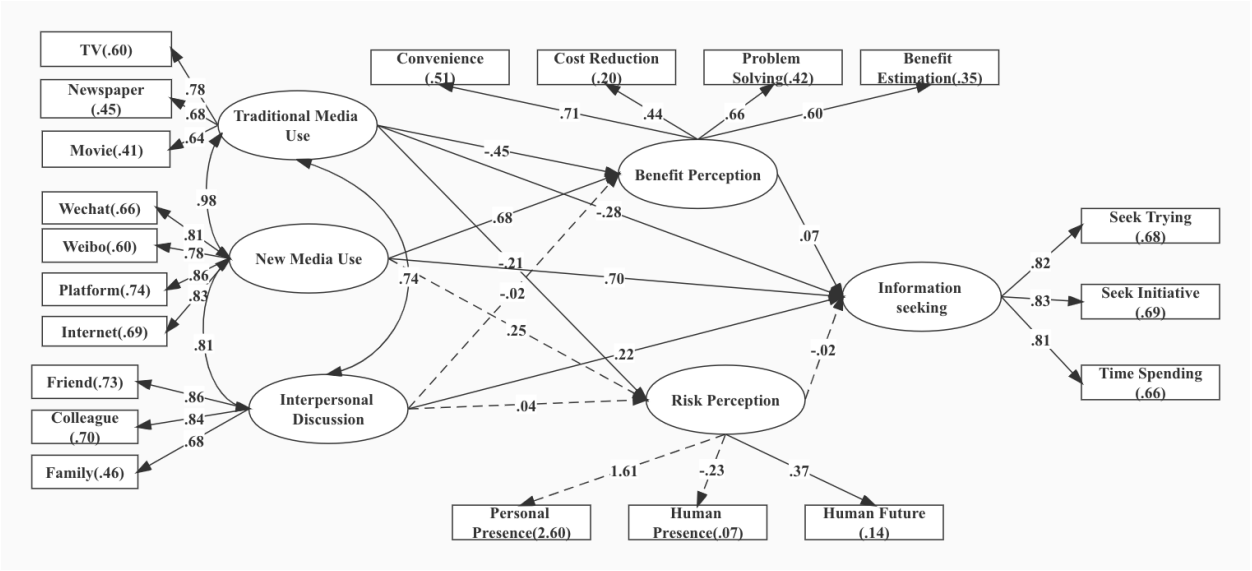

Figure 2. Structural equation modeling analysis of the effects of communication factors (traditional media use, new media use, and interpersonal discussion) on risk-benefit perception and information seeking. The coefficients are all standardized. All solid-line arrows are significant at $p < .05$ or better. Dotted-line arrows are non-significant at $p < .05$. R^2 values are reported in parentheses. The model fit is ideal: $X^2 = 436.761$, $df = 147$, $N = 746$, $p < .05$. CMIN/DF = 2.971, RMSEA = .051, GFI = .942, AGFI = .917, CFI = .958.

Discussion

Back to our research design, we found two pathways for individuals to seek information on AI topics: two direct pathways and two indirect pathways. The direct pathways showed that new media use and interpersonal discussion can both magnify individuals' information seeking behaviors directly, which showed the power of communication factors in information seeking, echoing the model of Wilson (1997). The other indirect pathways are that benefit perception can mediate the relationship between media use (both traditional and new media) and information seeking. Even for traditional media use which decreases people's information seeking behaviors, benefit perception can weaken the negative effects and make people seek information. It is

surprising that risk perception cannot play the mediating role the same as benefit perception. The possible reason behind this might be that Chinese people are not intolerable (Frewer, Howard, & Shepherd, 1998) about new technologies. Thus, they tend to follow the media agenda that mainly reflects the ideas of authoritarian institutions. As we mentioned above, the main agenda on AI set by the Chinese government is in the gesture of welcome, therefore it's no wonder that the Chinese public held the similar attitudes to embrace AI technology and laid more emphasis on the benefit of the emerging technology. Nevertheless, this reason also helps explain another interesting finding: traditional media use didn't have positive effects on risk perception on AI, but lowered the evaluation of risks. Stockmann and Gallagher (2011) stated that the Chinese government used television, one of the most important traditional media, to sustain control, and it is comprehensible that traditional media can set positive media agendas on AI and form public's perceptions.

From the viewpoint of practical issues, the study implies that communication practitioners, scientists and policy makers should emphasize new media and interpersonal discussion as the channels to build dialogues with the public about AI. Meanwhile, they are also supposed to emphasize the benefits of AI to attract people's attention and interest in AI technology.

Finally, some limitations of the study and suggestions for further research should be addressed. Though this study obtained data from a national sampling pool, the research design didn't put individuals in the context. As Ingwersen and Järvelin (2006) emphasized in their model, putting individuals in the context to understand information seeking considered cognitive actors. Future researchers can exploit longitude study and experiment design to realize the context in the study to understand human's information seeking behaviors about AI.

References

Agarwal, R., & Prasad, J. (1998). The antecedents and consequents of user perceptions in information technology adoption. *Decision Support Systems, 22*(1), 15-29. doi:https://doi.org/10.1016/S0167-9236(97)00006-7

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.

Besley, J. C., Lee, N. M., & Pressgrove, G. (2021). Reassessing the Variables Used to Measure Public Perceptions of Scientists. *Science Communication, 43*(1), 3-32. doi:10.1177/1075547020949547

Binder, A. R., Scheufele, D. A., Brossard, D., & Gunther, A. C. (2011). Interpersonal amplification of risk? Citizen discussions and their impact on perceptions of risks and benefits of a biological research facility. *Risk Analysis: An International Journal, 31*(2), 324-334.

Bradac, J. J. (2001). Theory comparison: Uncertainty reduction, problematic integration, uncertainty management, and other curious constructs. *Journal of Communication, 51*(3), 456-476.

Case, D. O., & Given, L. M. (2007). *Looking for information: A survey of research on information seeking, needs, and behavior.* (Second ed.). London: Elsevier.

Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology, 39*(5), 752-766.

ChinaInstituteforScienceandTechnologyPolicy. (2018). *China AI development report.* Retrieved from http://www.clii.com.cn/lhrh/hyxx/201807/P020180724021759.pdf

Dunwoody, S. (2014). Science journalism: prospects in the digital age. In B. M & T. B (Eds.), *Routledge handbook of public communication science and technology.* (pp. 15-26). New York: Routledge.

Fiske, S. T., & Taylor, S. E. (1991). *Social cognition.*: Mcgraw-Hill Book Company.

Frewer, L. J., Howard, C., & Shepherd, R. (1998). Understanding public attitudes to technology. *Journal of Risk Research, 1*(3), 221-235.

Gamson, W. A., & Modigliani, A. (1989). Media discourse and public opinion on nuclear power: A constructionist approach. *American journal of sociology, 95*(1), 1-37.

Gan, L., Chen, Y., Hu, P., Wu, D., Zhu, Y., Tan, J., . . . Zhang, D. (2021). Willingness to receive SARS-CoV-2 vaccination and associated factors among Chinese adults: a cross sectional survey. *International journal of environmental research and public health, 18*(4), 1993.

Griffin, R. J., Dunwoody, S., & Neuwirth, K. (1999). Proposed model of the relationship of risk information seeking and processing to the development of preventive behaviors. *Environmental Research, 80*(2), 230-245.

Ho, S. S., Scheufele, D. A., & Corley, E. A. (2013). Factors influencing public risk–benefit considerations of nanotechnology: Assessing the effects of mass media, interpersonal communication, and elaborative processing. *Public Understanding of Science, 22*(5), 606-623.

Huang, Y., & Yang, C. (2020). A metacognitive approach to reconsidering risk perceptions and uncertainty: understand information seeking during COVID-19. *Science Communication, 42*(5), 616-642.

Hwang, Y., & Jeong, S.-H. (2020). A Channel-Specific Analysis of the Risk Information Seeking and Processing (RISP) Model: The Role of Relevant Channel Beliefs and Perceived Information Gathering Capacity. *Science Communication, 42*(3), 279-312. doi:10.1177/1075547020926612

Ingwersen, P., & Järvelin, K. (2006). *The turn: Integration of information seeking and retrieval in context* (Vol. 18): Springer Science & Business Media.

Jia, Z., Liu, M., & Shao, G. (2019). Linking government social media usage to public perceptions of government performance: an empirical study from China. *Chinese Journal of Communication, 12*(1), 84-101.

Johnson, J. D., & Meischke, H. (1993). A comprehensive model of cancer-related information seeking applied to magazines. *Human Communication Research, 19*(3), 343-367.

Kahlor, L. A., Yang, J., Li, X., Wang, W., Olson, H. C., & Atkinson, L. (2020). Environmental Risk (and Benefit) Information Seeking Intentions: The Case of Carbon Capture and Storage in Southeast Texas. *Environmental Communication, 14*(4), 555-572. doi:10.1080/17524032.2019.1699136

Lievrouw, L. A. (2002). Determination and contingency in new media development: Diffusion of innovations and social shaping of technology perspectives. *Handbook of new media: Social shaping and consequences of ICTs*, 183-199.

Lin, C. A., & Lagoe, C. (2013). Effects of news media and interpersonal interactions on H1N1 risk perception and vaccination intent. *Communication Research Reports, 30*(2), 127-136.

Morton, T. A., & Duck, J. M. (2001). Communication and health beliefs: Mass and interpersonal influences on perceptions of risk to self and others. *Communication Research, 28*(5), 602-626.

Rimal, R. N., & Real, K. (2005). How behaviors are influenced by perceived norms: A test of the theory of normative social behavior. *Communication Research, 32*(3), 389-414.

Siegrist, M. (2000). The influence of trust and perceptions of risks and benefits on the acceptance of gene technology. *Risk analysis, 20*(2), 195-204.

Siegrist, M., Cousin, M.-E., Kastenholz, H., & Wiek, A. (2007). Public acceptance of nanotechnology foods and food packaging: The influence of affect and trust. *Appetite, 49*(2), 459-466.

Siegrist, M., Cvetkovich, G., & Roth, C. (2000). Salient value similarity, social trust, and risk/benefit perception. *Risk analysis, 20*(3), 353-362.

Siegrist, M., Stampfli, N., Kastenholz, H., & Keller, C. (2008). Perceived risks and perceived benefits of different nanotechnology foods and nanotechnology food packaging. *Appetite, 51*(2), 283-290.

Silva, P. (2015). Davis' technology acceptance model (TAM)(1989). *Information seeking behavior and technology adoption: Theories and trends*, 205-219.

Slovic, P. (1987). Percpetion of risk. *Science, 236*(4799), 280-285.

Stockmann, D., & Gallagher, M. E. (2011). Remote control: How the media sustain authoritarian rule in China. *Comparative Political Studies, 44*(4), 436-467.

Stuart, A. (2002). *Media, Risk and Science*. Buckingham: Open University Press.

Valente, T. W., & Saba, W. P. (1998). Mass media and interpersonal influence in a reproductive health communication campaign in Bolivia. *Communication Research, 25*(1), 96-124.

Wang, X. (2017). Understanding Climate Change Risk Perceptions in China: Media Use, Personal Experience, and Cultural Worldviews. *Science Communication, 39*(3), 291-312. doi:10.1177/1075547017707320

Wilson, T. D. (1997). Information behaviour: an interdisciplinary perspective. *Information processing & management, 33*(4), 551-572.

Wilson, T. D. (1999). Models in information behaviour research. *Journal of documentation*.

Yang, J. Z., & Liu, Z. (2020). Information Seeking and Processing in the Context of Vaccine Scandals. *Science Communication, 43*(3), 279-306. doi:10.1177/1075547020983589

Yang, J. Z., & Liu, Z. (2021). Information Seeking and Processing in the Context of Vaccine Scandals. *Science Communication, 43*(3), 279-306. doi:10.1177/1075547020983589

Zerbinos, E. (1990). Information Seeking and Information Processing: Newspapers versus Videotext. *Journalism Quarterly, 67*(4), 920-929. doi:10.1177/107769909006700446